FIG.1

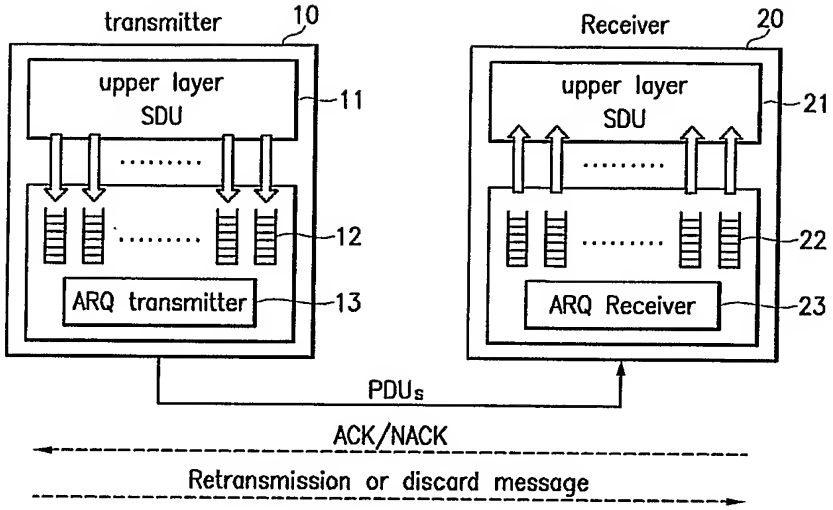

transmitter
10
upper layer SDU
11
12
ARQ transmitter
13
Receiver
20
upper layer SDU
21
22
ARQ Receiver
23
PDUs
ACK/NACK
Retransmission or discard message

FIG.2

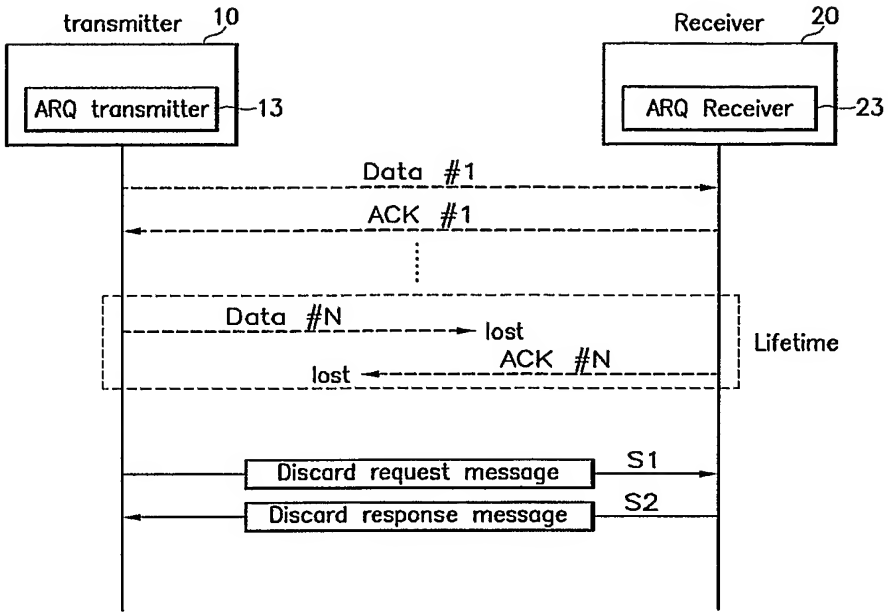

transmitter
10
Receiver
20
ARQ transmitter
13
ARQ Receiver
23
Data #1
ACK #1
Data #N
lost
ACK #N
lost
Lifetime
Discard request message
S1
Discard response message
S2

FIG.3

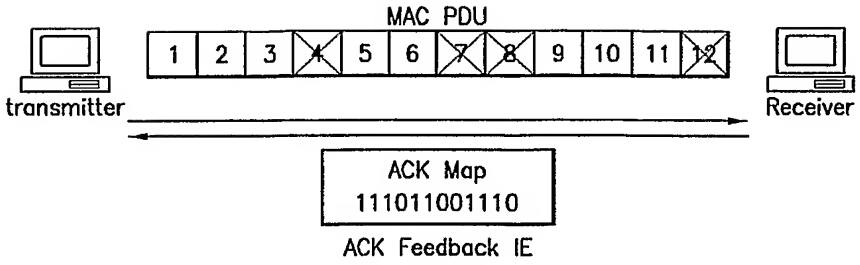

MAC PDU
1
2
3
4
5
6
7
8
9
10
11
12
transmitter
Receiver
ACK Map
111011001110
ACK Feedback IE

FIG.4

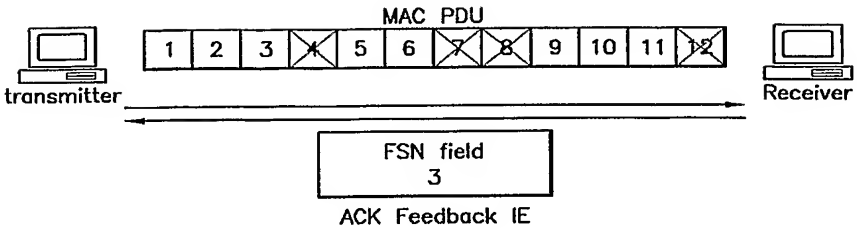

MAC PDU
1
2
3
4
5
6
7
8
9
10
11
12
transmitter
Receiver
FSN field
3
ACK Feedback IE

FIG.5

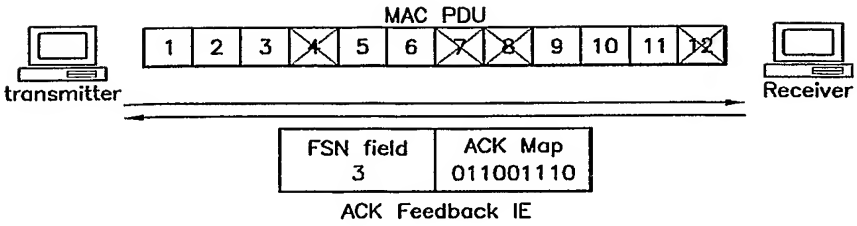

MAC PDU
1
2
3
4
5
6
7
8
9
10
11
12
transmitter
Receiver
FSN field
3
ACK Map
011001110
ACK Feedback IE

FIG.6

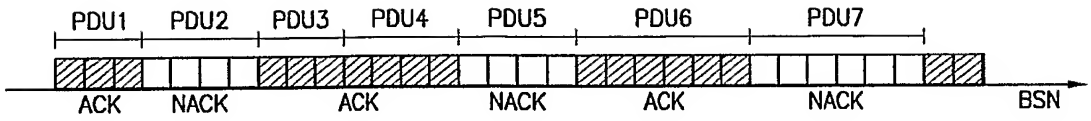

PDU1
PDU2
PDU3
PDU4
PDU5
PDU6
PDU7
ACK
NACK
ACK
NACK
ACK
NACK
BSN

FIG.7

applicable pattern	
... 1111 1[0]1 1111 1111 1111 1xxx xxxx ...	1: ACK
... 1111 10[1] 1111 1111 1111 1xxx xxxx ...	0: NACK
... 1111 1000 [1]111 1111 1111 1xxx xxxx ...	x: ACK or NACK
... 1111 1000 0[1]11 1111 1111 1xxx xxxx ...	1: First Cumulative ACK end block
...	[1]: Second Cumulative ACK start block
... 1111 1000 0000 0000 000[1] 1xxx xxxx ...	
... 1111 1000 0000 0000 0000 [1]xxx xxxx ...	

FIG.8

Syntax	Size	Notes
ARQ_feedback_IE (LAST) {	variable	
CID	16 bits	The ID of the connection being referenced.
LAST	1 bit	0 = More ARQ feedback IE in the list. 1 = Last ARQ feedback IE in the list.
ACK Type	2 bits	0x0 = Selective ACK entry 0x1 = Cumulative ACK 0x2 = Cumulative with Selective ACK 0x3 = Cumlative Bulk ACK
BSN	11 bits	
Number of ACK Maps	2 bits	The field indicates the number of ACK maps: If ACK Type == 01, 0x0 = 0, 0x1 = 1, 0x2 = 2, 0x3= 3; Otherwise, 0x0 = 1, 0x1 = 2, 0x2 = 3, 0x3= 4.
if (ACK Type!= 01) {		
for (i=0; i< Number of ACK Maps + 1; ++i) {		
ACK Map	16 bits	This field has different format according to ACK Type. See ACK Map.
}		
}		
}		

FIG.9

Syntax	Size	Notes
ACK MAP {	16 bits	
if (ACK Type == 03) {		
BSN	11 bits	BSN value indicates that its corresponding block and successive Length blocks have been successfully received.
Length	5 bits	
}		
else {		
Bit Map	16 bits	In the Bit Map, 1 means that the corresponding block has been successfully received, and 0 means that the corresponding block has not been successfully received.
}		
}		

FIG.10

Syntax	Size	Notes
ACK MAP {	16 bits	
if (ACK Type == 03) {		
Bulk Type	3 bits	Bulk Type indicates the ACK/NACK of the corresponding three bulks (1: ACK, 0: NACK): 1st bit: ACK/NACK of the first bulk, 2nd bit: ACK/NACK of the second bulk, 3rd bit: ACK/NACK of the third bulk.
First Bulk Length	5 bits	The number of blocks (or BSNs) in the first bulk.
Second Bulk Length	4 bits	The number of blocks (or BSNs) in the second bulk.
Third Bulk Length	4 bits	The number of blocks (or BSNs) in the third bulk.
}		
else {		
Bit Map	16 bits	In the Bit Map, 1 means that the corresponding block has been successfully received, and 0 means that the corresponding block has not been successfully received.
}		
}		

FIG.11

Syntax	Size	Notes
ACK MAP {	16 bits	
if (ACK Type == 03) {		
Bulk Type	3 bits	Bulk Type indicates the ACK/NACK of the corresponding three bulks (1: ACK, 0: NACK): 1st bit: ACK/NACK of the first bulk, 2nd bit: ACK/NACK of the second bulk, 3rd bit: ACK/NACK of the third bulk.
First Bulk Length	4 bits	The number of blocks (or BSNs) in the first bulk.
Second Bulk Length	4 bits	The number of blocks (or BSNs) in the second bulk.
Third Bulk Length	4 bits	The number of blocks (or BSNs) in the third bulk.
Reserved	1 bit	
}		
else {		
Bit Map	16 bits	In the Bit Map, 1 means that the corresponding block has been successfully received, and 0 means that the corresponding block has not been successfully received.
}		
}		

FIG.12

Syntax	Size	Notes
ACK MAP {	16 bits	
if (ACK Type == 03) {		
Bulk Configuration	1 bit	0: the number of bulks is 2 1: the number of bulks is 3
If (Bulk Configuration == 0) {		
Bulk Type	2 bits	Bulk Type indicates the ACK/NACK of the corresponding three bulks (1: ACK, 0: NACK): 1st bit: ACK/NACK of the first bulk, 2nd bit: ACK/NACK of the second bulk.
First Bulk Length	6 bits	The number of blocks (or BSNs) in the first bulk.
Second Bulk Length	6 bits	The number of blocks (or BSNs) in the second bulk.
Reserved	1 bits	
}		
Else if (Bulk Configuration == 1) {		
Bulk Type	3 bits	Bulk Type indicates the ACK/NACK of the corresponding three bulks (1: ACK, 0: NACK): 1st bit: ACK/NACK of the first bulk, 2nd bit: ACK/NACK of the second bulk, 3rd bit: ACK/NACK of the third bulk.
First Bulk Length	4 bits	The number of blocks (or BSNs) in the first bulk.
Second Bulk Length	4 bits	The number of blocks (or BSNs) in the second bulk.
Third Bulk Length	4 bits	The number of blocks (or BSNs) in the third bulk.
}		
}		
else {		
Bit Map	16 bits	In the Bit Map, 1 means that the corresponding block has been successfully received, and 0 means that the corresponding block has not been successfully received.
}		
}		

FIG.13

Syntax	Size	Notes
ACK MAP {	16 bits	
if (ACK Type == 03) {		
NACK Bulk Length	4 bits	The number of blocks (or BSNs) in the NCK bulk.
ACK Bulk Length	4 bits	The number of blocks (or BSNs) in the ACK bulk.
NACK Bulk Length	4 bits	The number of blocks (or BSNs) in the NACK bulk.
ACK Bulk Lenght	4 bits	The number of blocks (or BSNs) in the ACK bulk.
}		
else {		
Bit Map	16 bits	In the Bit Map, 1 means that the corresponding block has been successfully received, and 0 means that the corresponding block has not been successfully received.
}		
}		

FIG.14

Syntax	Size	Notes
ACK MAP {	16 bits	
if (ACK Type == 03) {		
Bulk Configuration	1 bit	0: the number of bulks is 2 1: the number of bulks is 3
If (Bulk Configuration == 0) {		
First Bulk Length	6 bits	The number of blocks (or BSNs) in the first bulk, the first bulk is always NACK when this ACK MAP is the first entry.
Next Bulk Flag	1 bit	Indicates the ACK/NACK of the next bulk
Second Bulk Length	6 bits	The number of blocks (or BSNs) in the second bulk.
Next Bulk Flag	1 bit	Indicates the ACK/NACK of the next bulk
Reserved	1 bits	
}		
Else if (Bulk Configuration == 1) {		
First Bulk Length	4 bits	The number of blocks (or BSNs) in the first bulk; the first bulk is always NACK when this ACK MAP is the first entry.
Next Bulk Flag	1 bit	Indicates the ACK/NACK of the next bulk
Second Bulk Length	4 bits	The number of blocks (or BSNs) in the second bulk.
Next Bulk Flag	1 bit	Indicates the ACK/NACK of the next bulk
Third Bulk Length	4 bits	The number of blocks (or BSNs) in the third bulk.
Next Bulk Flag	1 bit	Indicates the ACK/NACK of the next bulk
}		
}		
else {		
Bit Map	16 bits	In the Bit Map, 1 means that the corresponding block has been successfully received, and 0 means that the corresponding block has not been successfully received.
}		
}		

FIG.15

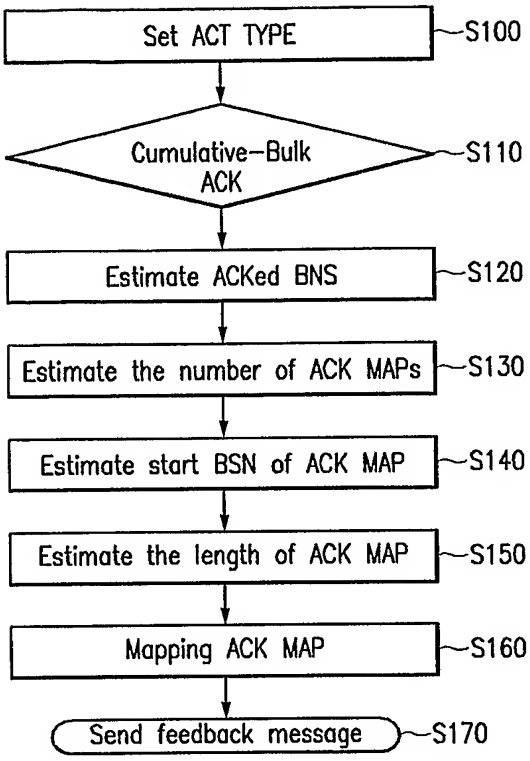
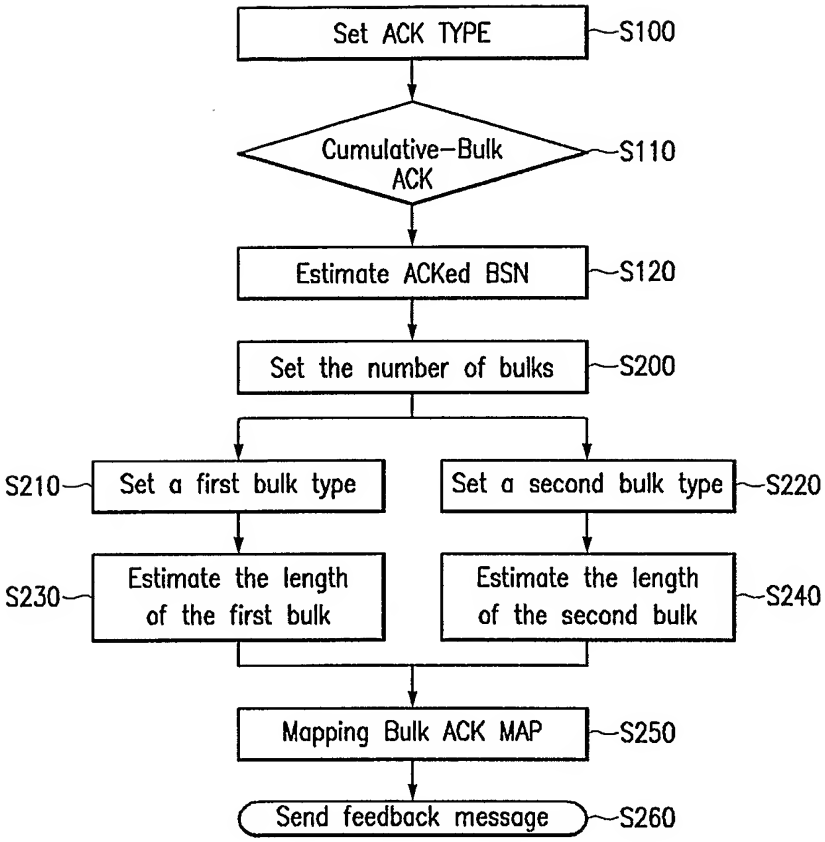

Set ACT TYPE
S100
Cumulative-Bulk ACK
S110
Estimate ACKed BNS
S120
Estimate the number of ACK MAPs
S130
Estimate start BSN of ACK MAP
S140
Estimate the length of ACK MAP
S150
Mapping ACK MAP
S160
Send feedback message
S170

FIG.16


Set ACK TYPE
S100
Cumulative-Bulk ACK
S110
Estimate ACKed BSN
S120
Set the number of bulks
S200
S210
Set a first bulk type
Set a second bulk type
S220
S230
Estimate the length of the first bulk
Estimate the length of the second bulk
S240
Mapping Bulk ACK MAP
S250
Send feedback message
S260